



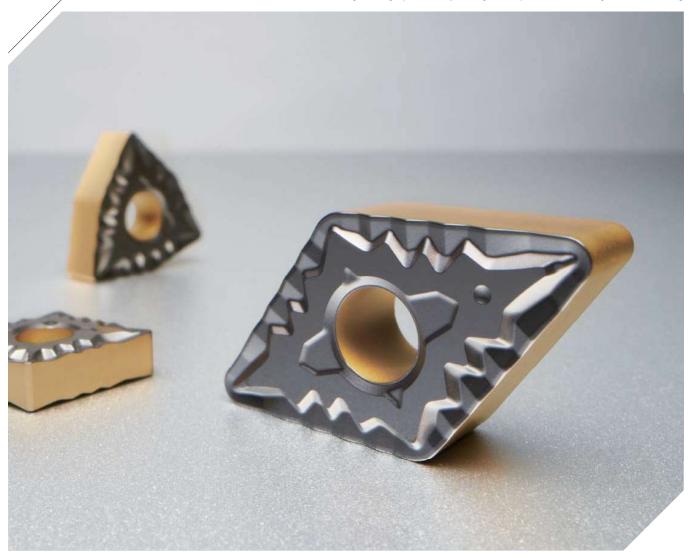
# CP Chip Breaker

# Turning negative insert for steel machining

(with strong cutting edge for medium to finishing)

• Good fracture resistance and chipping resistance even in heavy interruption due to strong cutting edge

• Stable machining and high productivity from good chip evacuation in high feed machining







#### Turning negative insert for steel machining

(with strong cutting edge for medium to finishing)

# CP Chip Breaker (Negative)

Machining of bearing parts generally used in automobile and general machinery industries requires toughness of cutting edge due to interrupted cutting condition and their high hardness. In addition, in deep grooving, tangled chips rolling up and scratching the workpieces causes the automatic machining inconsistent.

KORLOY's newly launched CP chip breaker enhanced chip evacuation, chip breaking and strength of cutting edge in interrupted turning.

The **CP chip breaker** applied the strengthened land to protect cutting edge and adopted 2-stepped back chip breaker with side rake angle and continuous bumps ensuring longer tool life by preventing chattering in high feed cutting. With its excellent chip evacuaction and chip breaking performances, it realizes convenience in the automatic machining.

The combination of CP chip breaker realizing high feed machining with high toughness and chip evacuation and NC3215P/NC3225P enhancing wear resistance and chipping resistance provides the best solution realizing efficiency and high productivity in automobile parts machining.

#### Machining automobile hub bearing and bearing parts

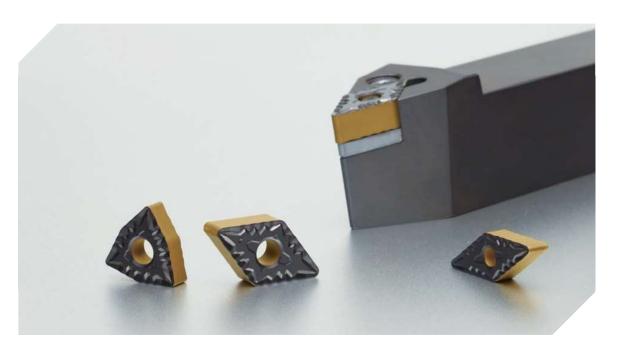
Enhanced chipping resistance in interrupted machining

#### >> High productivity

- Stable tool life in high feed machining

# >> Improved chip evacuation in deep machining

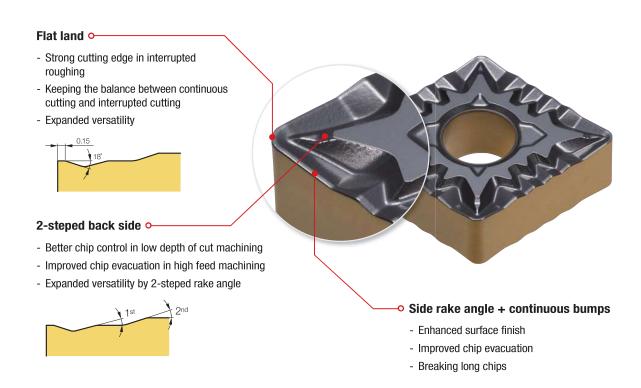
- Better chip evacuation out of the workpiece due to side rake angle



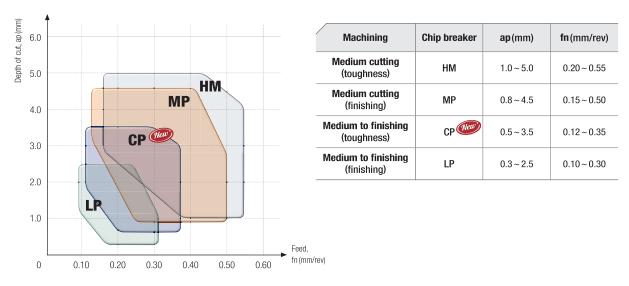
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#### **CP Chip breaker (for medium to finishing)**

- · Chip breaker with strong cutting edge for heavy interruption in the range of medium to finishing
- Effective chip control in the range from low depth of cut to high depth of cut due to 2-stepped back angle
- · Stable chip evacuation and breaking long chip in deep cutting by side rake angle and continuous bumps



# 



# ✓ Recommended cutting conditions

|           |                            |                                     |              |                |                                 |                     | Wear resista                      | nce 🔷 🗪  |  |         |           |  |
|-----------|----------------------------|-------------------------------------|--------------|----------------|---------------------------------|---------------------|-----------------------------------|--|--|---------|-----------|--|
| Workpiece |                            |                                     |              |                | Specific cutting                | Brinell<br>hardness | High speed and continuous cutting | Medium speed<br>and continuous/<br>interrupted cutting | Low speed and high interrupted cutting |         |           |  |
|           |                            |                                     |              |                | cutting<br>force Kc1<br>(N/mm²) | (HB)                |                                   | Grade  | C/B                                    |         |           |  |
| IS0       |                            | rkpiece<br>aterials                 | IS0          | AISI           | (N/IIIII1°)                     | (                   | NC3215P                           | NC3215P NC3225P  |  | СР      |           |  |
|           | 1116                       | ateriais                            |              |                |                                 |                     |                                   | vc (m/min)   | fn (mm/rev)                            | ap (mm) |           |  |
|           |                            |                                     |              | 1025           | 1500                            | 125                 | 245                               | 190  | 125                                    | 0.35    |           |  |
|           |                            | C=0.10~0.25%                        | C25          |                |                                 |                     | 305                               | 265  | 215                                    | 0.20    |           |  |
|           |                            |                                     |              |                |                                 |                     | 365                               | 335  | 285                                    | 0.12    |           |  |
|           |                            |                                     |              |                |                                 |                     | 200                               | 150  | 100                                    | 0.35    |           |  |
|           | Unalloyed<br>steel         | d C=0.25~0.55%                      | C=0.25~0.55% | C35            | 1035                            | 1600                | 150                               | 270  | 230                                    | 190     | 0.20      |  |
|           | 31001                      |                                     |              |                |                                 |                     | 350                               | 300  | 250                                    | 0.12    |           |  |
|           |                            |                                     |              |                |                                 |                     | 185                               | 130  | 95                                     | 0.35    |           |  |
|           |                            | C=0.55~0.80%                        | C45          | 1045           | 1700                            | 170                 | 245                               | 205  | 175                                    | 0.20    |           |  |
|           |                            |                                     |              |                |                                 |                     | 320                               | 275  | 225                                    | 0.12    |           |  |
|           | Low-alloy<br>steel<br>≤ 5% | Non-hardened  Hardened and tempered | 42CrMo4      |                | 1700                            | 180                 | 195                               | 140  | 100                                    | 0.35    |           |  |
|           |                            |                                     |              | 4140           |                                 |                     | 255                               | 205  | 175                                    | 0.20    |           |  |
|           |                            |                                     |              |                |                                 |                     | 310                               | 275  | 215                                    | 0.12    |           |  |
|           |                            |                                     | -            | 4145           | 2050                            | 350                 | 145                               | 90   | 65                                     | 0.35    |           |  |
| Р         |                            |                                     |              |                |                                 |                     | 200                               | 145  | 115                                    | 0.20    | 0.5 ~ 3.5 |  |
|           |                            |                                     |              |                |                                 |                     | 240                               | 200  | 150                                    | 0.12    |           |  |
|           |                            |                                     |              |                |                                 |                     | 155                               | 115  | 65                                     | 0.35    |           |  |
|           | High-alloy                 | Annealed                            | -            | D2             | 1950                            | 200                 | 220                               | 180  | 130                                    | 0.20    |           |  |
|           |                            |                                     |              |                |                                 |                     | 280                               | 240  | 190                                    | 0.12    |           |  |
|           | steel<br><5%               |                                     |              |                |                                 |                     | 115                               | 85   | 55                                     | 0.35    |           |  |
|           | 1576                       | Hardened tool steel                 | X40CrMoV5-1  | H13            | 3000                            | 352                 | 175                               | 135  | 95                                     | 0.20    |           |  |
|           |                            | 31001                               |              |                |                                 |                     | 235                               | 180  | 130                                    | 0.12    |           |  |
|           |                            | Low-alloy                           |              |                |                                 |                     | 130                               | 95   | 60                                     | 0.35    |           |  |
|           |                            | (alloying                           | -            | A148<br>(ASTM) | 1600                            | 200                 | 175                               | 140  | 100                                    | 0.20    |           |  |
|           | Steel castings             | elements ≤5%)                       |              | (101111)       |                                 |                     | 220                               | 185  | 135                                    | 0.12    |           |  |
|           |                            | Manganese<br>steel<br>12~14% Mn     | X120Mn13     | 3401           | 2900                            | 250                 | 70                                | 40   | 30                                     | 0.35    |           |  |
|           |                            |                                     |              |                |                                 |                     | 90                                | 60   | 45                                     | 0.20    |           |  |
|           |                            |                                     |              |                |                                 |                     | 110                               | 75   | 60                                     | 0.12    |           |  |

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#### NC3215P

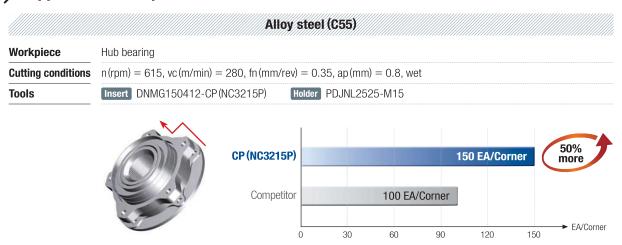
- · High temperature and high hardness coating with good wear resistance
  - For hot/cold forging steel and bearing steel continuous/interrupted cutting
- New coating technology → Enhanced wear resistance, welding resistance and long tool life
- Improved surface finish by special treatment after applying coating  $\rightarrow$  higher lubrication



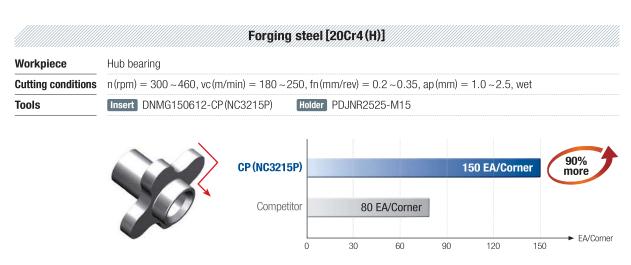
#### NC3225P

- · Less chipping and higher productivity due to lowered stress
  - For continuous/interrupted machining of general steels, forging steels of automobile parts and bearing steels
- Stable cutting edge ightarrow Good welding resistance and chipping resistance
- Improved surface finish by special treatment after applying coating  $\rightarrow$  higher lubrication

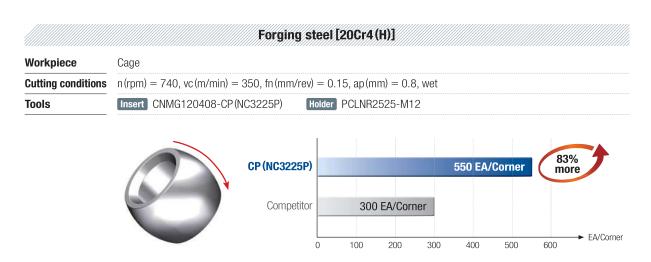
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- Flat land ensures stable machining without insert fracture in interrupted cutting.
- NC3215P coating realizes long tool life in high speed machining.



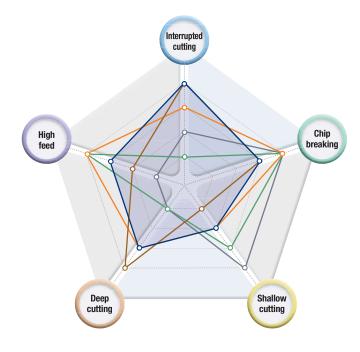
- Flat land ensures stable machining without insert fracture in interrupted cutting and increases chip evacuation in high feed machining.
- NC3215P coating realizes long tool life (higher chipping resistance) in unstable cutting condition with low cutting speed.



- 2-stepped back part ensures stable automation and regularly curled chip in low depth of cut cutting of R.
- NC3225P coating realizes long tool life in high speed machining.

# ✓ Negative chip breaker selection guide





#### НМ

· Chip control in various cutting condition due to unique tripod designed chip breaker



· Stable tool life in interrupted machining from strong cutting edge

#### MP

· High productivity from enhanced chip control in various cutting condition



• Stable tool life due to low cutting load in high speed and high feed machining



· Recommenced for interrupted machining due to flat land



• Better chip control in low depth of cut machining and chip evacuation in high feed machining due to 2-stepped back part of insert



· Better surface finish due to decreased cutting resistance with the inclined land structure



· Prevent chip curling and chip jamming at hard to chip evacuation spot by perfectly breaking chips with its specially designed dot structure

#### VC

 Stable chip control in copying with various depth of cut, tapering and internal diameter machining



| Machining           | Chip breaker | Interrupted cutting | Chip breaking | Shallow cutting | Deep cutting | High feed |
|---------------------|--------------|---------------------|---------------|-----------------|--------------|-----------|
| Medium              | нм           | ***                 | ***           | *               | ****         | **        |
| cutting             | MP           | ***                 | ****          | **              | ***          | ****      |
|                     | CP (New)     | ****                | ***           | **              | ***          | ***       |
| Medium to finishing | LP           | *                   | ****          | ***             | *            | ****      |
|                     | VC           | **                  | ****          | ***             | *            | *         |

# ✓ Stock items

|                | Designation |           | Coa     | ated    | Dimensions (mm) |        |      |     |      | Cutting condition |            |            |
|----------------|-------------|-----------|---------|---------|-----------------|--------|------|-----|------|-------------------|------------|------------|
| Picture        |             |           | NC3215P | NC3225P | L               | IC     | s    | RE  | D1   | fn<br>(mm/rev)    | ap<br>(mm) | Geometries |
|                | CNMG        | 090304-CP |         |         | 9.672           | 9.525  | 3.18 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
|                |             | 090308-CP |         |         | 9.672           | 9.525  | 3.18 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    |            |
|                |             | 090404-CP |         |         | 9.672           | 9.525  | 4.76 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
| •              |             | 090408-CP |         |         | 9.672           | 9.525  | 4.76 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    | RE         |
|                |             | 120404-CP | •       | •       | 12.896          | 12.7   | 4.76 | 0.4 | 5.16 | 0.10~0.35         | 0.5~3.5    |            |
| de             |             | 120408-CP | •       | •       | 12.896          | 12.7   | 4.76 | 0.8 | 5.16 | 0.12~0.35         | 0.5~3.5    | 800        |
|                |             | 120412-CP | •       | •       | 12.896          | 12.7   | 4.76 | 1.2 | 5.16 | 0.13~0.35         | 0.8~3.5    |            |
|                |             | 160608-CP | •       | •       | 16.12           | 15.875 | 6.35 | 0.8 | 6.35 | 0.15~0.40         | 0.8~4.5    |            |
|                |             | 160612-CP | •       | •       | 16.12           | 15.875 | 6.35 | 1.2 | 6.35 | 0.18~0.40         | 1.0~4.5    |            |
| ı              | DNMG        | 110404-CP |         |         | 11.628          | 9.525  | 4.76 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
|                |             | 110408-CP |         |         | 11.628          | 9.525  | 4.76 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    |            |
|                |             | 110504-CP |         |         | 11.628          | 9.525  | 5.56 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
|                |             | 110508-CP |         |         | 11.628          | 9.525  | 5.56 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    | RE         |
|                |             | 150404-CP | •       | •       | 15.508          | 12.7   | 4.76 | 0.4 | 5.16 | 0.10~0.35         | 0.5~3.5    | 10         |
| S.P. Sagar     |             | 150408-CP | •       | •       | 15.508          | 12.7   | 4.76 | 0.8 | 5.16 | 0.12~0.35         | 0.5~3.5    | 55°        |
|                |             | 150412-CP | •       | •       | 15.508          | 12.7   | 4.76 | 1.2 | 5.16 | 0.13~0.35         | 0.8~3.5    | 1          |
|                |             | 150604-CP | •       | •       | 15.508          | 12.7   | 6.35 | 0.4 | 5.16 | 0.10~0.35         | 0.5~3.5    |            |
|                |             | 150608-CP | •       | •       | 15.508          | 12.7   | 6.35 | 0.8 | 5.16 | 0.12~0.35         | 0.5~3.5    |            |
|                |             | 150612-CP | •       | •       | 15.508          | 12.7   | 6.35 | 1.2 | 5.16 | 0.13~0.35         | 0.8~3.5    |            |
| 9              | SNMG        | 090304-CP |         |         | 9.525           | 9.525  | 3.18 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
|                |             | 090308-CP |         |         | 9.525           | 9.525  | 3.18 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    |            |
| 31/4           |             | 090404-CP |         |         | 9.525           | 9.525  | 4.76 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    | RE         |
|                |             | 090408-CP |         |         | 9.525           | 9.525  | 4.76 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    |            |
|                |             | 120404-CP | •       | •       | 12.7            | 12.7   | 4.76 | 0.4 | 5.16 | 0.10~0.35         | 0.5~3.5    | 900        |
|                |             | 120408-CP | •       | •       | 12.7            | 12.7   | 4.76 | 0.8 | 5.16 | 0.12~0.35         | 0.5~3.5    | °          |
|                |             | 120412-CP | •       | •       | 12.7            | 12.7   | 4.76 | 1.2 | 5.16 | 0.13~0.35         | 0.8~3.5    |            |
| 1              | rnmg        | 110304-CP |         |         | 10.999          | 6.35   | 3.18 | 0.4 | 2.86 | 0.08~0.26         | 0.4~2.5    |            |
|                |             | 110308-CP |         |         | 10.999          | 6.35   | 3.18 | 0.8 | 2.86 | 0.10~0.26         | 0.4~2.5    | 60°        |
| <u> </u>       |             | 160404-CP | •       | •       | 16.498          | 9.525  | 4.76 | 0.4 | 3.81 | 0.10~0.30         | 0.5~3.0    | HE.        |
| 200            |             | 160408-CP | •       | •       | 16.498          | 9.525  | 4.76 | 0.8 | 3.81 | 0.12~0.30         | 0.5~3.0    |            |
|                |             | 160412-CP | •       | •       | 16.498          | 9.525  | 4.76 | 1.2 | 3.81 | 0.13~0.30         | 0.8~3.0    |            |
|                |             | 220408-CP | •       | •       | 21.997          | 12.7   | 4.76 | 0.8 | 5.16 | 0.15~0.35         | 0.8~4.0    | - L    -8  |
|                |             | 220412-CP | •       | •       | 21.997          | 12.7   | 4.76 | 1.2 | 5.16 | 0.18~0.35         | 1.0~4.0    |            |
| 1              | VNMG        | 160404-CP | •       | •       | 16.606          | 9.525  | 4.76 | 0.4 | 3.81 | 0.10~0.35         | 0.5~3.0    | RE         |
| Si Oue         |             | 160408-CP | •       | •       | 16.606          | 9.525  | 4.76 | 8.0 | 3.81 | 0.12~0.30         | 0.5~3.0    | IC         |
|                |             | 160412-CP | •       | •       | 16.606          | 9.525  | 4.76 | 1.2 | 3.81 | 0.13~0.30         | 0.8~3.0    | 35° L      |
| 1              | WNMG        | 060404-CP |         |         | 6.515           | 9.525  | 4.76 | 0.4 | 3.81 | 0.08~0.30         | 0.4~3.0    |            |
|                |             | 060408-CP |         |         | 6.515           | 9.525  | 4.76 | 0.8 | 3.81 | 0.10~0.30         | 0.4~3.0    | RE         |
| 37 45          |             | 080404-CP | •       | •       | 8.687           | 12.7   | 4.76 | 0.4 | 5.16 | 0.10~0.35         | 0.5~3.5    |            |
| S. Contraction |             | 080408-CP | •       | •       | 8.687           | 12.7   | 4.76 | 0.8 | 5.16 | 0.12~0.35         | 0.5~3.5    | 80°        |
|                |             | 080412-CP | •       | •       | 8.687           | 12.7   | 4.76 | 1.5 | 5.16 | 0.13~0.35         | 0.8~3.5    | L          |
|                |             | 080416-CP | •       | •       | 8.687           | 12.7   | 4.76 | 1.6 | 5.16 | 0.14~0.35         | 0.8~3.5    |            |